Shrimp & Scallop Vessel Tracking & Landings Data Collection Pilot Program

Final Report

State of Maine, Department of Marine Resources

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Summary

The Maine Department of Marine Resources (DMR) sought to develop a Shrimp & Scallop Vessel Tracking and Landings Data Collection Pilot Program to collect data that would enable the DMR to better manage these fishery resources. A Request for Quotes (RFQ) was released to solicit bids from companies that would be able to provide the hardware/software packages as well as the customer support to test a Vessel Monitoring System (VMS) that would provide location data for the participating vessel as well as an interface with which to report landings on a daily basis. Based on the scoring criteria, Locus Traxx out of Jupiter, FL provided the most competitive bid at a total cost of $5,999.10 for 3 months of testing for 30 possible participants.

Unfortunately, due to the length of time required to complete the RFQ and parts for the hardware packages not being available in a timely fashion, the hardware/software packages were not delivered and installed until mid-way through the scallop season and after the shrimp season had commenced, in late-January and only provided a 2 month window to effectively test the package in both fisheries. Overall, the tracking unit performed satisfactorily, providing accurate location data for the majority of the period. However, the first generation tablet that was provided to harvesters failed to successfully delivery landings data reports the majority of the time. The tablets were replaced with an Android Galaxy 7 tablet in mid-February, and functioned satisfactorily at landings report submissions. Customer service representatives were available the majority of the time and when not immediately available, reached out to harvesters in a timely fashion to provide assistance and troubleshooting advice. Unfortunately, the reporting portion of the project did not perform as desired; all of the fields provided to the manufacturer to be included on the tablet were not incorporated, only allowing for a harvesters to submit a partial reports, and this would not be a valid replacement of paper reports as desired by both industry members and the DMR. In addition, the raw data were not available in a bulk fashion, making it necessary to pull data for each individual harvester, which was tedious and inefficient. While the Oversight map interface provided the opportunity to review individual boat tracks for specific periods of time, there was no way to query how many trips total a vessel declared it fished, which is necessary if a system were developed to allow harvesters to pick their fishing days. Finally, due to the fact that the tracking unit was not performing 100% of the time, with anomalies on land or network outages, this package would not be a useful tool for enforcement purposes, as the information collected would never be able to be used in the court system due to its unreliability. Overall, while this is a package may be offered at an extremely affordable price, it does not provide the reliability and ease of use to meet the tracking, data reporting and enforcement needs of the DMR. Therefore, it is recommended that DMR explore other vendors for a tracking and data collection package, research other projects that are currently employing tracking and data collection packages in their fisheries as well as identify funding sources that could cover the costs that would potentially be associated with implementing a formal vessel monitoring and data collection program.

Background

The DMR sought to develop a Maine Shrimp & Scallop Vessel Tracking and Landings Data Collection Pilot Program to collect data that will enable the Department to better manage these fishery resources. Timely monitoring of the northern shrimp quota has been extremely challenging during the past three fishing seasons, delinquent reports have resulted in overages of the total allowable catch (TAC). As a result, it is anticipated shrimp fishery will have very low quota allocations in future years; a more timely data collection system could ensure that such overages do not occur. Tracking scallop harvesters' fishing activities could provide a useful tool for enforcement and management in regards to area and seasonal closures, while timely landings data allow managers to estimate biomass removals from Limited Access Areas with a TAC. Currently, both harvester and dealer reporting are required in both fisheries; however, many harvesters and dealers frequently do not submit landings data until the time of license renewal for the next fishing season. This pilot program tested a means of obtaining daily reporting from harvesters which would provide more timely and accurate data since harvesters would not have to recall catches after a month or longer period of time has elapsed. Harvester data would also include catch not sold to licensed dealers (e.g. catch sold to peddlers, kept for personal use, or sold directly to the public) that is estimated in season during the quota management. In addition, due to inclement weather, harvesters are unable to fish the specified calendar days for both fisheries, resulting in an unpredictable and uneven supply of shrimp and scallops for the markets. Therefore, the goal of the vessel tracking component of this pilot program was to investigate if a VMS system was accurate and reliable enough to potentially allow harvesters to choose which days they wish to harvest based on weather and market availability.

Project Award Results

An evaluation team, comprised of DMR science, management and enforcement staff reviewed proposals from three bidders that were solicited through a state RFQ and provided the resulting evaluation scores which were based on the merits of the proposal received in accordance with the criteria defined in the RFQ, and in accordance with the most advantageous cost for the State. The three companies that submitted bids to the RFQ and were evaluated according to the scoring criteria (Appendix A) were Pole Star (Absolute Software, Inc.), Alltrackers, and Locus Traxx. The selection process accorded equal opportunity and appropriate consideration to all who were capable of meeting the specifications. The goals of the evaluation were to ensure fairness and objectivity in review of the proposals and to ensure the contract was awarded to the bidder whose proposal best satisfied the criteria of the RFQ at a reasonable/competitive cost.

The review team used a consensus approach to evaluate the bids. Members of the review team did not score the proposals individually, but instead arrived at a consensus as to assignment of points on each category of each proposal. The contract award was made to the bidder receiving the highest number of evaluation points, based upon the proposals' satisfaction of the criteria established in the RFQ. Bidders were to be responsible for the complete execution of the implementation plan to consist of the following steps: furnishing and installation, training, monitoring, and data collection services. Based on the scoring criteria, Locus Traxx won the award for the pilot project at a cost of $5,999.10 (Table 1). For individual scoring results, please refer to scoring sheets in Appendix B.

#	BIDDER	COST	SCORE COST (#/25)	SCOPE OF WORK SCORE (#/50)	EXPERIENCE SCORE (#/25)	TOTAL SCORE (#/100)
1	POLESTAR	$31,600.00	4	35	25	64
2	ALLTRACKERS	$20,250.00	7	7	0	14
3	LOCUS TRAXX	$5,999.10	25	40	15	80

Table 1. Summary of scoring results for the three bidders that submitted proposals to the RFQ.

Work Performed

As the award winner, Locus Traxx, was responsible for the complete execution of the implementation plan to consist of the following steps: furnishing and installation, training, monitoring, and data collection services, as detailed in the RFQ for the duration of the scallop and shrimp seasons, a three month period.

Furnishing and Installation

Locus Traxx contracted out the furnishing and installation of the hardware packages, which included a tracking unit, antenna and associated wiring, to two local contractors: Sawyer & Whitten (Mike Whitten) for vessels located west of Penobscot Bay and Blackmore Electronics (Blaine Blackmore) for vessels located east of Penobscot Bay. The installation contractors coordinated with participating harvesters to have installations made at a location that was convenient to the participants. For the majority of the installations, a DMR and Locus Traxx staff member was also present to assist with installations as well as to answer any questions from the harvesters.

While a total of 30 participants were originally sought for this project and installations were to begin on January 1, 2013, installations did not commence until January 21, 2013 and only 14 participants had the system installed (Table 1). Hardware orders arrived late which delayed the installations; by the time the installations occurred, many volunteers from the shrimp fishery decided to stop fishing at the end of January due to the low TAC and many scallop harvesters withdrew because the majority of the scallop fishing grounds had been closed.

#	VESSEL	FIRST NAME	LAST NAME	TOWN	FISHERY	GEAR	INSTALATION
1	BLACK PEARL	CLYDE	POLAND	BREMEN	SCALLOP	DRAGGER	01.21.13
2	CAPTAIN MORGAN	DANA	BLACK	ORLAND	SCALLOP	DRAGGER	02.02.13
3	CAVALIER	KENNETH	HUNT	PHIPPSBURG	SHRIMP	DRAGGER	01.29.13
4	CLEAN SWEEP	BENJAMIN	CROCKER	ROQUE BLUFFS	SHRIMP & SCALLOP	DRAGGER	01.21.13
5	CROSSFIRE	RICKY	TRUNDY	DEER ISLE	SHRIMP	DRAGGER	01.22.13
6	DENISE MARIE	MICHAEL	DAWSON	BRISTOL	SHRIMP	DRAGGER	01.21.13
7	FIRST IMPRESSION	JAMES	WEST	SORRENTO	SHRIMP & SCALLOP	DRAGGER	01.28.13
8	HYPOCRITE	JUSTIN	BOYCE	STONINGTON	SCALLOP	DRAGGER	01.22.13
9	JACOB & JOSHUA	DANIEL	TODD	FREEPORT	SHRIMP & SCALLOP	DRAGGER	01.22.13
10	LESLIE & JESSICA	GARY	LIBBY	PORT CLYDE	SHRIMP	DRAGGER	01.29.13
11	MURPHY'S LAW	MICHAEL	MURPHY	MACHIASPORT	SCALLOP	DRAGGER	01.21.13
12	OUTER LIMITS	JOSEPH	LIBBY	BEALS	SHRIMP	DRAGGER	01.21.13
13	TENACIOUS	WILLIS	SPEAR	PORTLAND	SHRIMP	DRAGGER	01.22.13
14	THUNDERSTRUCK	JOHN	GEYER	BRISTOL	SHRIMP	DRAGGER	01.21.13

Table 1. Project participant information, including fishing port, fishery and installation date.

The installation process involved mounting the tracking unit (SmartTraxx) inside the vessel, mounting an antenna on the top of the vessel, connecting wires to both pieces of hardware to a power source and the activation of the unit to the network (Figure 1). The installation contractors worked with fishermen to determine the best location for all the hardware and to ensure that it was installed in the least intrusive manner, using existing holes and mountings if possible. A green light indicated that the tracking unit was connected to a power source and a seal was connected to the unit to prevent tampering (Figure 2).

Figure 1. Installation of the tracking unit hardware.

Figure 2. Locus Traxx marine grade GPS tracking unit (SmartTraxx); mounted, connected to power as indicated by the green light, and then furnished with a tamperproof seal.

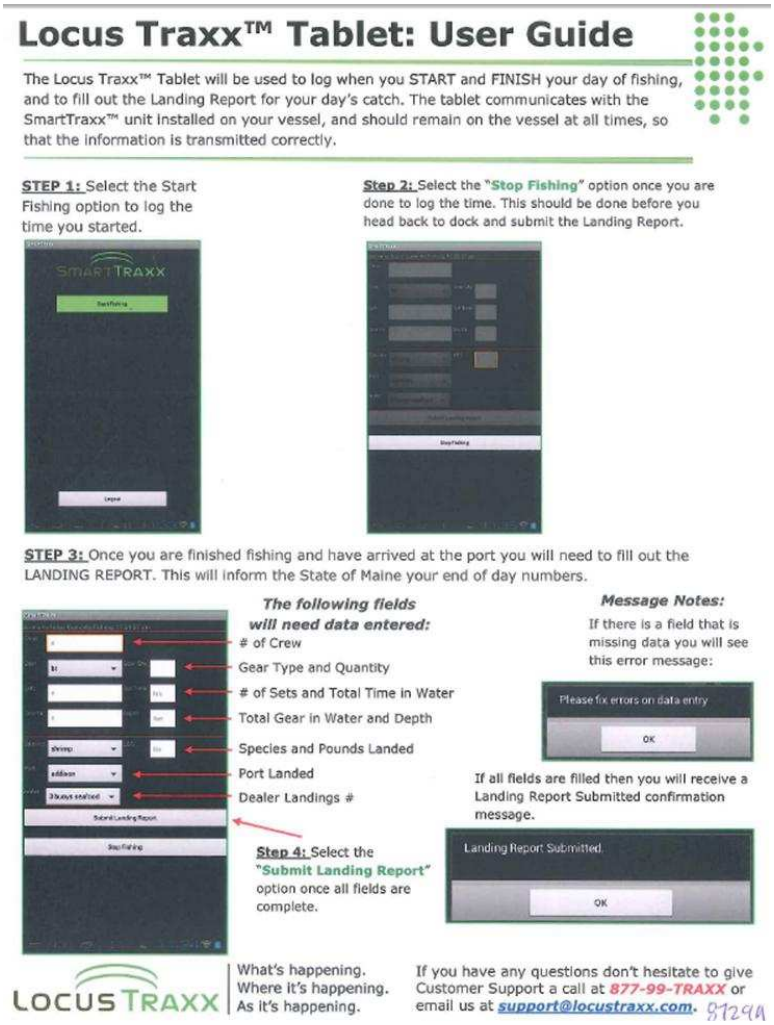
Locus Traxx representatives provided weekly updates to DMR on the progress of installations until the successful completion of all 14 units was completed on February 2, 2013. Successful dummy reports were received for all units once the installation was complete, with the exception of F/V Outer Limits, for which no reports were received.

Training

Once the vessel operators received the tracking and data collection units and a successful test report was submitted, participants were trained how to use the unit. For the major of the installations, a Locus Traxx representative was present to conduct this task to ensured that participants could submit a dummy report and that participants understand how to contact the 24/7 customer service toll-free help line should an issue arise during the pilot project period (Figure 3).

Figure 3. Project participants receiving training from Locus Traxx representatives.

In addition, a training session was provided for DMR staff on January 16, 2013 and a one page handout was provided to participants to assist with the effective use of the tracking and data collection units (Figure 4).



Locus Traxx™ Tablet: User Guide

The Locus Traxx™ Tablet will be used to log when you START and FINISH your day of fishing, and to fill out the Landing Report for your day's catch. The tablet communicates with the SmartTraxx™ unit installed on your vessel, and should remain on the vessel at all times, so that the information is transmitted correctly.

STEP 1: Select the Start Fishing option to log the time you started.

Step 2: Select the "**Stop Fishing**" option once you are done to log the time. This should be done before you head back to dock and submit the Landing Report.

STEP 3: Once you are finished fishing and have arrived at the port you will need to fill out the LANDING REPORT. This will inform the State of Maine your end of day numbers.

The following fields will need data entered:

- # of Crew
- Gear Type and Quantity
- # of Sets and Total Time in Water
- Total Gear in Water and Depth
- Species and Pounds Landed
- Port Landed
- Dealer Landings #

Message Notes:

If there is a field that is missing data you will see this error message:

Please fix errors on data entry

OK

If all fields are filled then you will receive a Landing Report Submitted confirmation message.

Landing Report Submitted.

OK

Step 4: Select the "**Submit Landing Report**" option once all fields are complete.

LOCUS TRAXX | What's happening. Where it's happening. As it's happening.

If you have any questions don't hesitate to give Customer Support a call at ***877-99-TRAXX*** or email us at ***support@locustraxx.com***.

Figure 4. Informational handout was provided to participants by Locus Traxx.

Vessel Tracking

Positional data was collected via transmissions from the SmartTraxx unit and viewed by DMR staff through an online platform called "OverSight" (Figure 5). Once logged into the website, a user could go to the OverSight map to see the participating vessel's location information overlaid on a Google Earth map.

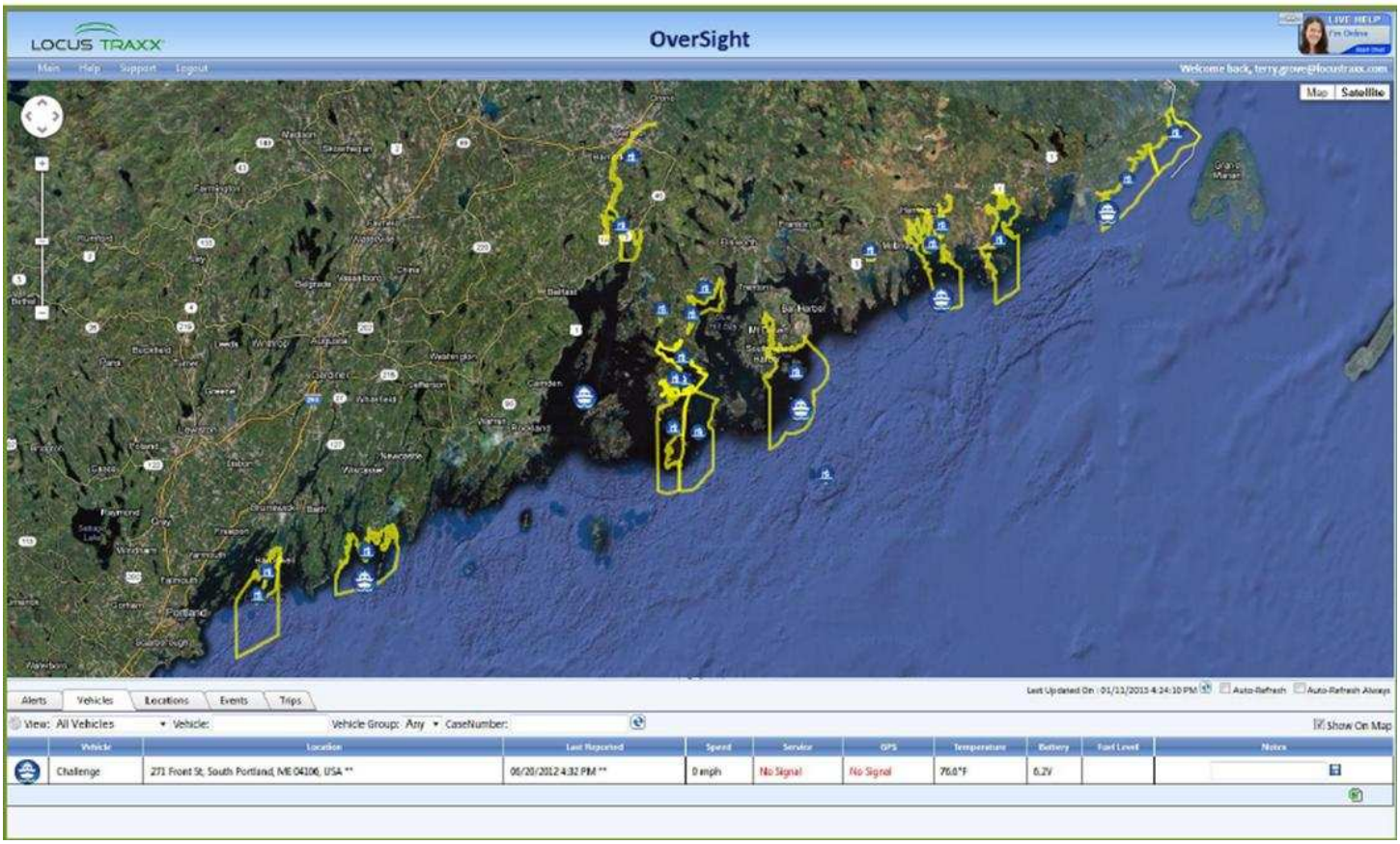


Figure 5. Sample of the OverSight map with locations of participating vessels and geo-fenced scallop areas.

DMR requested that the transmission of positional data be grouped according to three different categories:

1. **Off/stationary** – when vessel is not in use (i.e. at the dock) or has remained stationary for a length of time, the unit should be able to record a signal every 6 hours to indicate the unit is still working properly and that the vessel is off/stationary. Transmission of data for off/stationary vessels is required in real time.

2. **On/Moving in non-geo-fenced area**- when the vessel is powered up, the unit shall be activated by the vessel power and begin recording signals every 45 minutes to track movement location. Transmission of data for vessel moving in non-geo-fenced areas should occur in real time.

3. **On/moving in geo-fenced area**- once the vessel enters the pre-defined geo-fenced areas, the signal shall be recorded every 15 minutes; these data must also be flagged for ease of use by the Department. Transmission of data for vessels moving in non-geo-fenced areas should occur in real time.

DMR also requested positional data be identified as actively fishing or not, the website be updated as soon as data are transmitted, data are made available for DMR pulls within 24 hours after transmission , and that if a vessel is outside transmission range, the data must be stored and immediately sent once communication is re-established.

The information could be viewed for an individual vessel by selecting a vessel's icon on the OverSight map or by selecting it from a list at the bottom of the screen. The vessel's positional data could be selected for a specified period and could be populated on the OverSight map (Figure 6). Specific information was available for each transmitted position that included the vessel name, data, time, latitude, longitude, direction and speed as requested. Information was populated on the OverSight map when a vessel entered or exited a geo-fenced area, when the vessel was turned on, off or idle or when the vessel was "out of network range" or had gone into sleep mode to save power. When a vessel was "out of network range", the information that was stored during that time period was populated onto the OverSight map when the vessel returned back into range, except on one occasion with F/V Clean Sweep (it took several days for this information to be populated onto the OverSight map). Unfortunately, while DMR requested the location data be tracked every 6 hours when the vessel was turned off or stationary, 45 minutes outside of a geo-fenced area, and every 15 minutes inside a geo-fenced area, the location data was transmitted every 5 minutes regardless of vessel location or activity. Therefore, it was not possible to test if the level of transmissions could be changed when in or out of a geo-fenced area, as was desired. The ability to change these settings remotely was never tested.

The OverSight map did have a visual notice when the vessel entered or exited a geo-fenced area; start and stop ignition notices also allowed DMR to determine whether a vessel was actively fishing . The flagging of non-functional units was successful on the OverSight map, but no notice was sent to DMR staff as requested when this occurred. However, when a non-functional unit was identified by DMR, Locus Traxx technicians were available via the online chat option and coordinated the replacement and/or troubleshooting in a rapid manner.

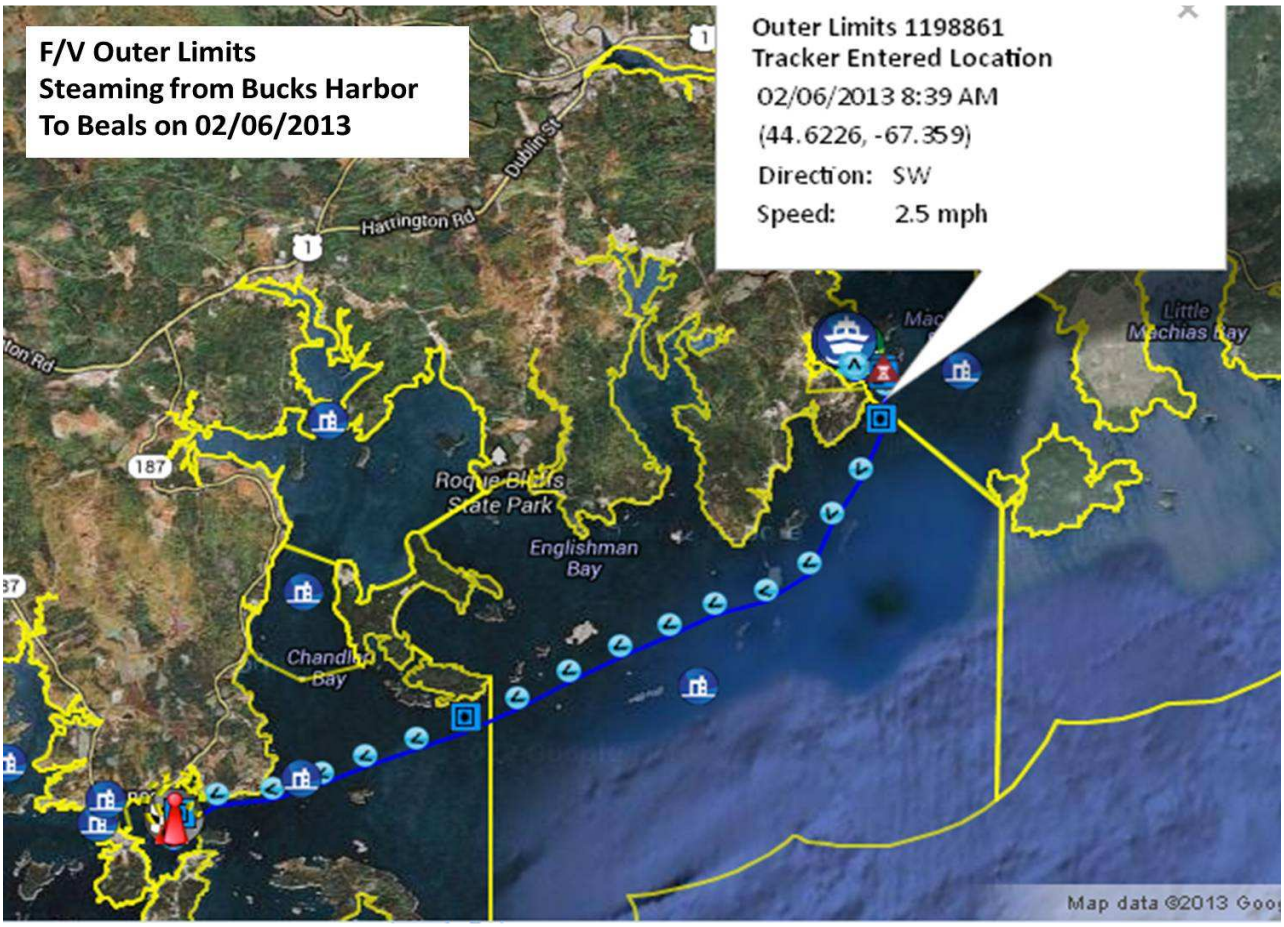


Figure 6. F/V Outer Limits location data on a Google Earth background with scallop area geo-fences in yellow.

Data Collection Services

When the units were installed on the fishing vessels, a Locus Traxx representative was available to show the harvesters how to report the trip using the tablet. All the harvesters indicated the instruction was sufficient, although a laminated "cheat sheet" would be helpful, especially for those who are less tech savvy. Harvesters indicated that Locus Traxx support was always friendly and responsive.

When actively fishing, many harvesters indicated they forgot to push the start and stop fishing buttons several times. One harvester indicated it was too difficult to remember to do this each trip because there is so much going on aboard the boat, while others indicated it may become habit eventually. However, because there could be significant distances between different areas fished, the information obtained from the button push is of limited value to the DMR Landings Program. There is also no way currently for DMR to download the positional data and relate it to the catch data.

The positional data for one harvester in New Harbor was consistently incorrect at the start of the project, and eventually Locus Traxx was able to fix the problem by opening up areas to satellite that were unavailable before. DMR would like to better understand if the satellite backup capability is available whenever there is not cell reception, or if this is a feature that Locus Traxx has to enable for certain areas.

Reporting

Although all harvesters liked the idea of having the option of reporting electronically, it is imperative the system is quick and easy to use. For example, having "favorites" for certain fields is a necessity. At the minimum, the dealer and port landed fields should be favorites, so when selecting from these fields, only a limited number of choices are available to keep the scrolling to a minimum. Scrolling with cold hands at the end of a fishing trip is time consuming and frustrating. Populating fields from what was previously entered should also be an option except for the following fields: number of tows, tow time and pounds. Type-ahead features should also be implemented in all text fields.

Many harvesters split their catch from one trip and sell to more than one dealer, sell to the public, and/or keep part of their catch for home consumption. There is currently no way to split the catch from one trip, so this functionality would have to be implemented in order to obtain accurate information from harvesters.

Most harvesters indicated they were unsure if reports were submitted successfully. After a harvester submits a report, a large confirmation button should be displayed until the harvester closes it. An option for sending a confirmation text message or email should be available. There should also be an option for harvesters to view previous reports submitted.

Obtaining accurate and timely data from harvesters is important, but in order for the information to be considered for quota managed fisheries, there must be a way for harvesters to report actual weights in addition to hail weights. In some fisheries, it is common practice for harvesters to land their catch and transport it to where the dealer is located; in this case, having the ability to take a mobile device with them to update the trip with the weights would be necessary.

Many harvesters indicated DMR should offer reporting software on various devices. For example, the reporting application should be available to download on the harvester's personal smartphone or laptop computer, so the harvester can report on the device with which they are most comfortable. One harvester indicated it was frustrating to not be able to see the entire screen at one time, while others indicated this was not an issue for them. Having the option of downloading the app to a laptop may alleviate this frustration.

DMR also needs the capability to update the dealer list frequently and easily, as new dealers often buy licenses throughout the year. One harvester said that he sold to a dealer that was not in the list, yet the dealer was currently licensed.

Overall, most harvesters would rather report electronically instead of on paper, if the system was easier to use. They indicated providing more timely data to DMR is important to them, as it is more accurate; they hoped that with more timely information in the future, quota monitored fisheries (such as shrimp) could be open longer than it is currently because of the uncertainty in reporting.

In order to evaluate the effectiveness of the reporting tool Locus Traxx developed, the poundage reported electronically was matched up to the poundage reported on paper. However, there were several difficulties in doing this for the 14 individuals involved. First, the test records and duplicate reports had to be identified in the electronic dataset and removed. It was also evident that records could not always be matched because both data sets had trips recorded for which there was not a corresponding paper or electronic report (Table 2). Of those that could be matched up by day, the electronically reported weights were slightly different than the paper reported weights, probably due to hail weights being reported electronically vs. actual weights reported on paper. The range of over reporting varied between 0 and 18%. One overage of 55% for one participant was attributed to misreporting a weight for one trip electronically; and one report was reported electronically under an incorrect species. The comparison could not be completed for all participants because 36% had not submitted their paper reports by the time the evaluation began in July. Of the 382 reports submitted electronically, 37% were tests, 36% were completed, 24% failed and 3% were duplicates (Table 3).

Participant	Species	% error from paper reports	Paper Trips Not Matched to Electronic Data	Electronic Trips Not Match to Paper
1	scallop	14	4	4
2	scallop	-1	5	4
3	shrimp	0	2	0
4	scallop	0	5	6
4	shrimp	-7	2	3
5	shrimp	6	5	1
6	shrimp	0	7	0
7		no paper report submitted		
8	scallop	-6	7	0
8	shrimp	misreported species electronically		
9	scallop	55	8	0
9	shrimp	18	0	0
10		no paper report submitted		
11	scallop	0	9	5
12		no paper report submitted		
13		no paper report submitted		
14		no paper report submitted		

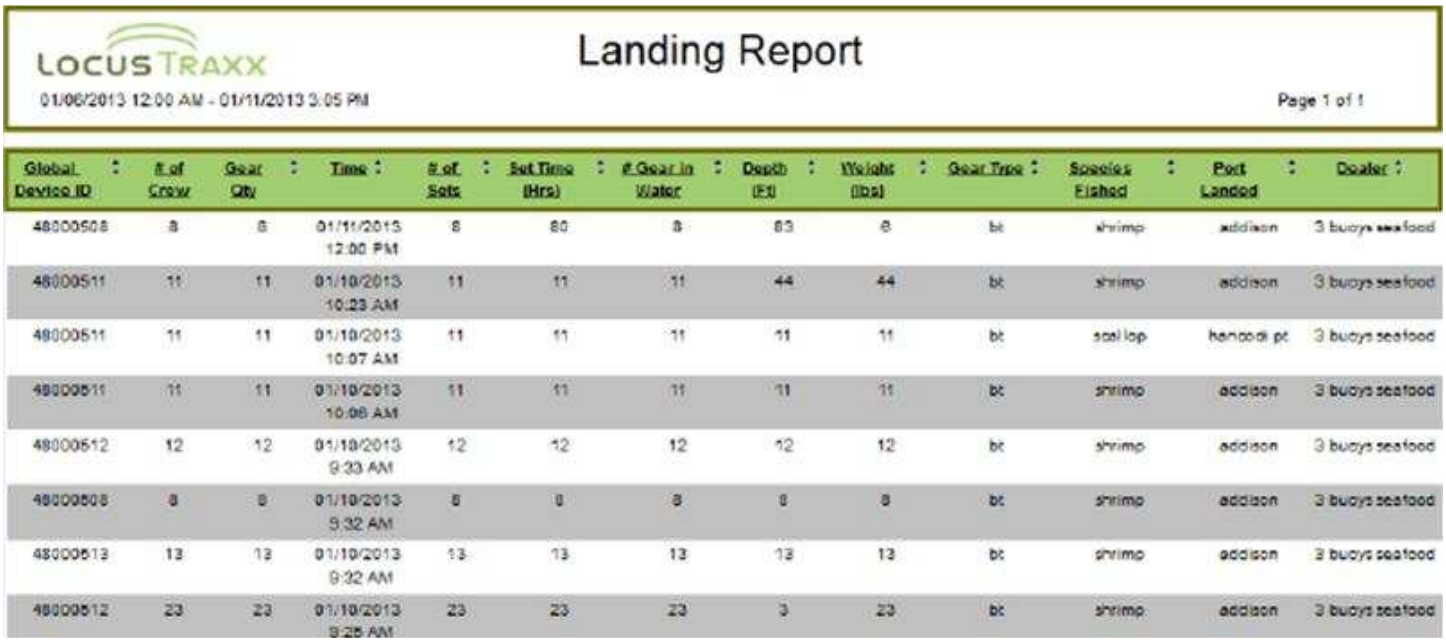
Table 2: Summary of paper vs. electronic reporting

Participant	Test	Duplicate	Failed	Completed	Total
1	5	1	2	13	**21**
2	8	0	5	11	**24**
3	25	0	2	3	**30**
4	5	4	7	10	**26**
5	9	2	1	13	**25**
6	3	0	9	6	**18**
7	6	1	7	19	**33**
8	8	3	6	20	**37**
9	4	0	12	18	**34**
10	18	0	5	5	**28**
11	29	0	14	10	**53**
12	4	0	0	0	**4**
13	13	0	10	8	**31**
14	6	0	12	0	**18**
Total	**143**	**11**	**92**	**136**	**382**

Table 3: Breakdown of electronic reports submitted by participant.

There were two types of tablets provided to fishermen that were used to report with; a custom made tablet and a Samsung Galaxy 7 tablet with an Android operating system. The first custom tablet that was provided to fishermen was considered to be a complete failure. The tablet was successfully submitting reports 34% of the time. Due to this low success rate, harvesters became increasingly frustrated with the tablets poor performance as did DMR staff. Around the second week of February, the replacement tablets were sent out to harvesters. These tablets performed much better and submitted successful reports 89% of the time.

Lastly, when reviewing landings reports from the website, it would be helpful if the headers could stay static while scrolling down the report page (Figure 12).



LOCUS TRAXX

Landing Report

01/06/2013 12:00 AM - 01/11/2013 3:05 PM

Page 1 of 1

Global Device ID	# of Crew	Gear Qty	Time	# of Sets	Set Time (Hrs)	# Gear in Water	Depth (Ft)	Weight (lbs)	Gear Type	Species Fished	Port Landed	Dealer
48000508	8	8	01/11/2013 12:00 PM	8	80	8	63	8	bt	shrimp	addison	3 buoys seafood
48000511	11	11	01/10/2013 10:23 AM	11	11	11	44	44	bt	shrimp	addison	3 buoys seafood
48000511	11	11	01/10/2013 10:07 AM	11	11	11	11	11	bt	sail lop	hancock pt	3 buoys seafood
48000511	11	11	01/10/2013 10:06 AM	11	11	11	11	11	bt	shrimp	addison	3 buoys seafood
48000512	12	12	01/10/2013 9:33 AM	12	12	12	12	12	bt	shrimp	addison	3 buoys seafood
48000508	8	8	01/10/2013 9:32 AM	8	8	8	8	8	bt	shrimp	addison	3 buoys seafood
48000513	13	13	01/10/2013 9:32 AM	13	13	13	13	13	bt	shrimp	addison	3 buoys seafood
48000512	23	23	01/10/2013 9:25 AM	23	23	23	3	23	bt	shrimp	addison	3 buoys seafood

Figure 12. Landing report example from the OverSight web page. DMR recommends making the headers, highlighted in green, static, so they can be viewed while scrolling down and reviewing landings data.

OverSight Website

Overall, the OverSight website provided an opportunity for DMR staff to gain a better understanding about how fishermen utilize the scallop and shrimp resources. Each day, a DMR staff member was able to track which vessels were fishing and in what area. The OverSight website also provided the opportunity to effectively coordinate with sampling staff for the shrimp fishery, so that samplers were at the dock at the time that the shrimp vessel sought to be sampled was coming in. The majority of the time, when customer support was contacted over online chat, a representative was available; however, there were times when one was not immediately available. While the website itself provided a large amount of detailed information, there were several issues that were encountered during the project.

The OverSight map itself was very slow to load, and at times would not load at all, as indicated by an error prompt (Figure 7). This decreased the ease of use of the website, as information could not be gathered on vessels in a time efficient manner, and sometimes not at all.

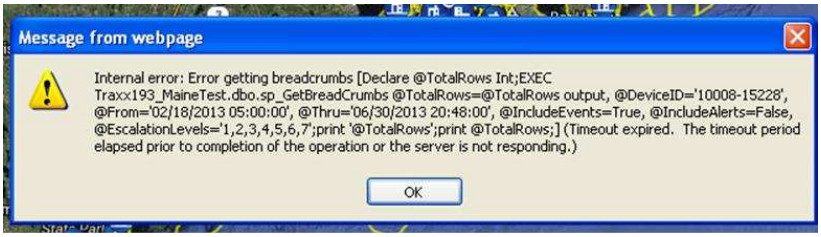


Figure 7. Error message received when location data from a vessel was being requested.

DMR staff had requested that geo-fences detailing scallop management areas be integrated into the OverSight map (Figure 8). Unfortunately, this was not fully completed until nearly the end of the project (Figure 9). When the geo-fences where populated, there was an additional area that was incorporated that was not related to scallop, as indicated by the red arrow in Figure 9. Also, the file provided to Locus Traxx had the management areas color coded according to what type of area it was (closed area [red], limited access area [green], rotational area [blue]) which would make the map easier to read (Figure 9). Unfortunately, the color coding and the legend indicating what type of management area the geo-fence was not incorporated, rendering the map confusing, cluttered and resulting in it loading even more slowly than before.

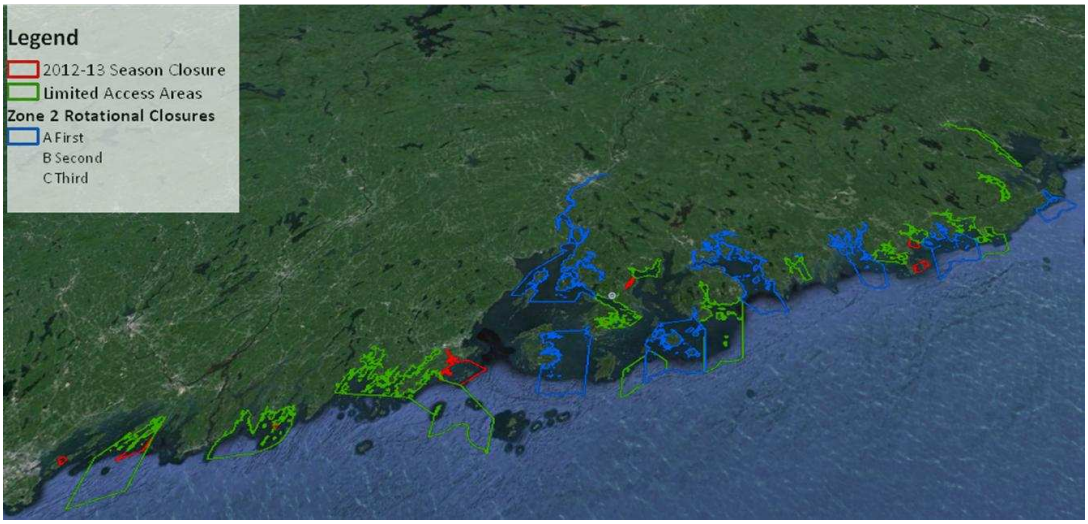


Figure 8. Original file of all the requested geo fences of different scallop management areas, depicted according to management area type. Red = Closure, Green = Limited Aces Area, and Blue = Rotational Closure.

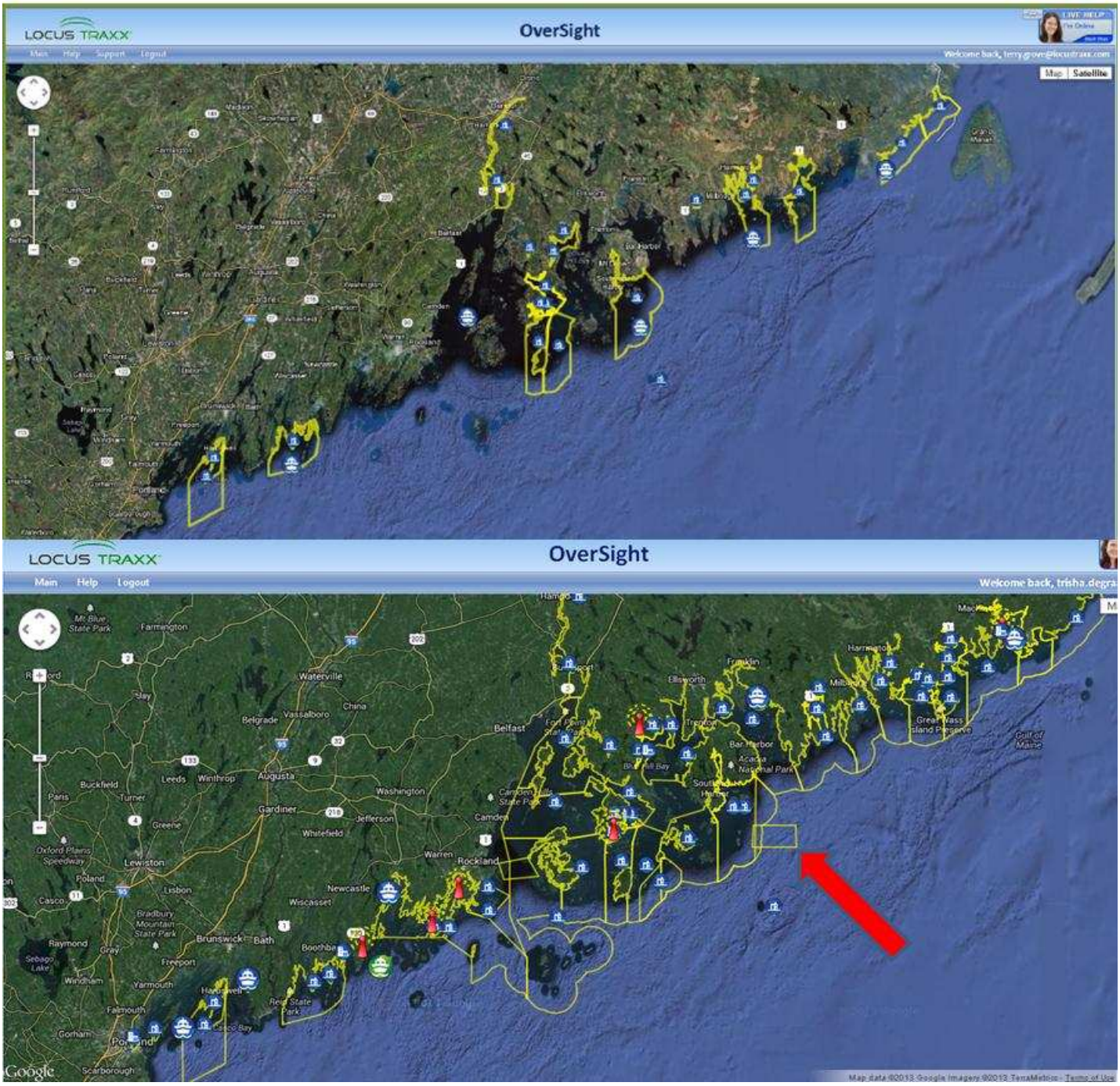


Figure 9. Top image showing only a few of the requested geo fences on the OverSight map. Bottom image showing all the requested geo fences being displayed as all the same color (yellow). Area shown on map, but not part of the scallop management areas indicated by the red arrow.

DMR requested that a notification be sent to a DMR staff member when there was a "network outage" for a tracker unit. This request was never met and no notices were sent to DMR. DMR staff members were only able to visible identify the problem when they logged in to the OverSight website and would alert a customer service representatives so the problem could be rectified with the participating harvester. There were several instances where a "network outage" or tracker anomaly occurred, and it was not clear why this happened. For some outages, when the tracker unit came back online, the vessel location tracks were re-populated onto the OverSight map (Figure 10).

Figure 10. Tracking data for F/V Clean Sweep. Originally, in real time this track displayed a "network outage" icon with no tracking data past the location circled in red. However, a few days later, the track was successfully repopulated on the OverSight map.

Other times, it was found that this information did not repopulate and the track was a straight line from the last transmitted location to when the tracker came back online, which bisected land (Figure 10).

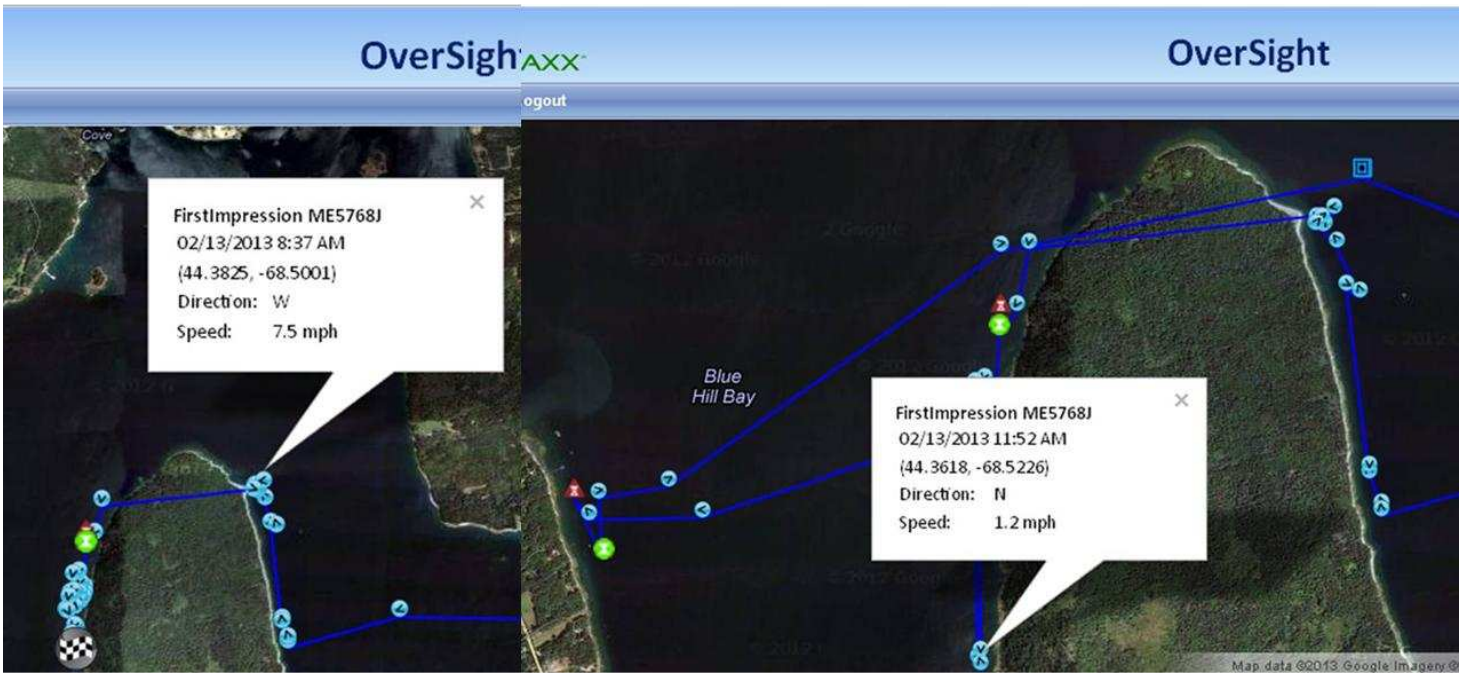


Figure 10. Tracking data from F/V First Impressions on 2/13/13 indicating a network outage and lost tracking data.

Tracking anomalies included the tracking data indicating that the vessel was on land, or that the vessel had "jumped" to a new location, that was not in the immediate vicinity of where the harvester confirmed he was working all day (Figure 11). The anomalies of outages encountered during this pilot program are of particular concern for enforcement, as officers need to be able to identify where a vessel is 100% of the time.

Figure 11. Tracking data anomalies from F/V First Impressions 02/08/13 (upper left) and F/V Jacob & Joshua on 1/23/13 (upper right) and 02/06/13 (bottom).

Finally, there was no easy way to determine how many fishing days to date a vessel had declared. This was an important aspect of the VMS package as that the goal of this program was to find a system that could offer the industry a way to pick fishing days. The only way to discern this information was to pick each vessel's daily track, one by one, which is much too onerous and simply not an effective way to gather data. The start/stop fishing button also did not appear to log information anywhere.

Enforcement

DMR enforcement felt the VMS hardware and software package was inadequate for enforcement needs. Staff felt the OverSight map and web portal was not fast enough to load and the layout was not clear or easy to understand. A fair number of times, the boat was "out of area" when the officers were logged in or was not showing up at all on OverSight and the officer knew the boat was actively fishing. Officers contacted personnel at Locus Traxx and found that the unit could not find cell reception. This was early on in the project.

Overall, enforcement staff stated this system could not be an enforcement tool at all because it is not 100% accurate and therefore could not use the data in court to prosecute violations. Enforcement also stated they already know what vessels are out in an area on any particular day as this is already an officer's responsibility.

Harvesters/Volunteer Participants Feedback

Feedback was gathered from participating harvesters throughout the project and in two meetings hosted by DMR staff on June 17th for Downeast participants and June 19th for participants residing west of Penobscot Bay; questionnaires were also provided to participants directly (Appendix C). In general, harvesters felt the system was easy to use. While there were many difficulties with the first tablet, many of these issues were resolved with the second tablet. Harvesters stated the first generation tablet would not hold a charge so the unit had to be plugged in to a power source constantly; it would also shut down all of a sudden or it lost reception. This required the harvesters to re-log in and the majority (68%) of the reports were not submitted successfully. One harvester stated the tablet would simply "stop fishing" even though he did not press the "stop fishing" button.. Harvesters called Locus Traxx customer support many times, and Locus Traxx did replace the tablets with Android Galaxy 7 tablets during the first week of February. Once harvesters switched to the new tablet, the power and reporting issues were mostly rectified; however, the majority of the harvesters kept their tablets plugged into a power source all the time. One harvester commented that DC power would not work with the tablet, only AC power.

Harvesters stated that entering data in each individual field was repetitive and onerous, and that the fields were too small to see. They suggested that the software either default to the last entry for each field, auto populate as an entry is made or that a short list of favorites for port and dealer be available to make this task easier. Harvesters requested that once logged-in, they stay logged-in until they signed out, despite losing power or moving out of network range. Also, harvesters would prefer to make up their own, easy to remember, passwords.

Many of the fishermen did not remember to push the "start/end fishing" buttons during their fishing activities. One harvester noted that once a report was sent, the software immediately prompted the harvester to start a new trip on the new tablet. Also, when a report was sent, there was no confirmation that it was submitted successfully, and often the harvester would call DMR or Locus Traxx staff to confirm it was received. Harvesters requested that touch options be larger so mistakes can be reduced, the tablet have a larger successful landing report submission notification that is easy to read and stayed on the screen until the harvester clicked "ok" and that a second confirmation (i.e. "Are you sure you want to submit?") was texted/emailed to the harvester. This would also reduce the duplicate reports being submitted because harvesters were unsure if the reports were submitted sucessfully. Harvesters were unable to review reports that were previously submitted and wished to be able to have this option. Harvesters did not have the ability to view the entire report on the screen at once and could only scroll down so far; they would prefer to see the whole sheet to ensure it was filled completely. Overall, if the reporting app were easy to use, then harvesters would prefer to report electronically than through paper reports.

When harvesters contacted Locus Traxx customer support via the toll-free number, a technician was immediately available the majority of the time. In the few cases where they were not, Locus Traxx technicians got back in touch with the harvester in a timely fashion. Agents assisted harvesters with troubleshooting problems, such as network outages, and gave instructions on how to reset the hardware or how to pick up a signal to be able to transmit landings data successfully. After many unsuccessful reports with the first

generation tablets, customer support requested harvesters contact them while submitting the reports to try to determine what the issue was. New tablets were sent to all harvesters to rectify this issue.

Harvesters were satisfied with the installation process. Many of the harvesters were already acquainted with the personnel conducting the installations because local marine electricians were contracted for the installations. The majority of the installations were performed in a timely fashion and at a location convenient to the harvesters. Installations were made using existing holes and wiring ports so to ensure that the hardware installation were the least intrusive as possible. Harvesters felt that the tracking unit pulled more power than had been stated, with two harvesters reporting that after a few weeks of being tied up, their batteries were dead. It was suggested that the tracker unit be connected to a battery switch so there would be no tampering and the battery would not be drained. Finally, the majority of harvesters stated they could uninstall the hardware themselves and would ship it back to the company if needed. One harvester mentioned that if there was a two-way communication option, that emergency closings, time of day closings, etc. could be transmitted to harvesters. A few harvesters mentioned that it would be great if a reporting application could be developed for their smart phone that could be used in lieu of the tablet. The antenna used during the project was not weather proof or rugged enough and it was suggested that they need to be marine grade. Some of the wiring and connectors had too little coating and had to be siliconed to make more durable, which was messy.

Harvesters in New Harbor, South Bristol, Bucks Harbor, Blue Hill and Stonington areas all encountered the most problems with network outages, most likely due to the limited cell coverage in these areas, which pose management and enforcement challenges. The satellite backup for tracking data did not seem to be functioning for the location data that was supposed to be transmitted during these outages. One harvester noted that while he could visually see the cellular towers in Blue Hill area, he still had no reception.

Budget

DMR staff had budgeted $6,000 for this project, but used only $2,399.60 of this because only 14 volunteers participated. Costs were based on a flat rate leasing cost per unit of $59.99/month over a 3 month period (Figure 13, 14, 15). Due to the unfortunate sinking of one of the participants vessels in early February (Joseph Libby, F/V Outer Limits), Locus Traxx billed DMR for 13 units for February and March.

LOCUS TRAXX
What's Happening.
Where it's happening.
As it's happening.

INVOICE FOR SERVICES

14924 Corporate Rd. S
Jupiter, FL 33478
561-575-7600
locustraxx.com

DATE OF RECEIPT	DELIVERED TO	Invoice #	TERMS
2/1/2013	Various	10008-0213	NET 15

CUSTOMER BILLING ADDRESS	CUSTOMER SHIPPING ADDRESS
Dept. Of Marine Resources PO Box 8 West Boothbay Harbor, ME 04575	

FULL DESCRIPTION		PRICE	QUANTITY	SALES TAX	TOTAL
Marine Units February 2013					
TRAXX NO.	P.O. NO. / COMMENTS				
48000518	Ricky Trundy	$ 59.99	14		$ 839.86
48000523	James West				
48000524	Gary Libby				
48000525	Michael Dawson				
48000526	Benjamin Crocker Jr.				
48000528	Clyde Poland Jr.				
48000534	Joseph Libby				
48000537	Alex (Daniel) Todd				
48000538	Justin Boyce				
48000540	Willis Spear III				
48000541	John Geyer				
48000542	Kenneth Hunt				
48000544	Michael Murphy II				
48000536	Dana Black				

Figure 13. Locus Traxx monthly invoice for January, indicating the $59.99/ month/unit leasing cost for 14 participants.

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Jupiter, FL 33478
561-575-7600
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DATE OF RECEIPT	DELIVERED TO	Invoice #	TERMS
3/1/2013	Various	10008-0313	NET 15

CUSTOMER BILLING ADDRESS	CUSTOMER SHIPPING ADDRESS
Dept. Of Marine Resources PO Box 8 West Boothbay Harbor, ME 04575	

FULL DESCRIPTION		PRICE	QUANTITY	SALES TAX	TOTAL
Marine Units March 2013					
TRAXX NO.	P.O. NO. / COMMENTS				
48000518	Ricky Trundy	$ 59.99	13		$ 779.87
48000523	James West				
48000524	Gary Libby				
48000525	Michael Dawson				
48000526	Benjamin Crocker Jr.				
48000528	Clyde Poland Jr.				
48000537	Alex (Daniel) Todd				
48000538	Justin Boyce				
48000540	Willis Spear III				
48000541	John Geyer				
48000542	Kenneth Hunt				
48000544	Michael Murphy II				
48000536	Dana Black				

Figure 14. Locus Traxx monthly invoice for February, indicating the $59.99/ month/unit leasing cost for 13 participants.

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14924 Corporate Rd. S
Jupiter, FL 33478
561-575-7600
locustraxx.com

DATE OF RECEIPT	DELIVERED TO	Invoice #	TERMS
4/1/2013	Various	10008-0413	NET 15

CUSTOMER BILLING ADDRESS	CUSTOMER SHIPPING ADDRESS
Dept. Of Marine Resources PO Box 8 West Boothbay Harbor, ME 04575	

FULL DESCRIPTION		PRICE	QUANTITY	SALES TAX	TOTAL
Marine Units April 2013					
TRAXX NO.	P.O. NO. / COMMENTS				
48000518	Ricky Trundy	$ 59.99	13		$ 779.87
48000523	James West				
48000524	Gary Libby				
48000525	Michael Dawson				
48000526	Benjamin Crocker Jr.				
48000528	Clyde Poland Jr.				
48000537	Alex (Daniel) Todd				
48000538	Justin Boyce				
48000540	Willis Spear III				
48000541	John Geyer				
48000542	Kenneth Hunt				
48000544	Michael Murphy II				
48000536	Dana Black				

Figure 15. Locus Traxx monthly invoice for March, indicating the $59.99/ month/unit leasing cost for 13 participants.

Conclusion & Recommendations

Overall, while Locus Traxx provides a low cost tracking and data collection package, it did not meet all the requirements set out in RFQ. Unfortunately, due to the length of time required to complete the RFQ and parts for the hardware packages not being available in a timely fashion, the hardware/software packages were not delivered and installed until mid-way through the scallop season and after the shrimp season had commenced, in late-January, and only provided a two month window to effectively test the package in both fisheries. Overall, the tracking unit performed satisfactorily, providing accurate location data for the majority of the period. However, the first generation tablet failed to successfully delivery landings data reports the majority of the time. The tablets were replaced with an Android Galaxy 7 tablet in mid-February, and functioned satisfactorily with landings report submissions. Customer service representatives were available the majority of the time and when not immediately available, contacted harvesters in a timely fashion to provide assistance and troubleshooting advice. Unfortunately, the reporting portion of the project did not perform as desired; the fields provided to the manufacturer to be included on the tablet were not all incorporated, only allowing for a harvesters to submit a partial reports, and this would not be a valid replacement of paper reports. In addition, the raw data were not available in a bulk fashion, making it necessary to pull data for each individual harvester, which was tedious and inefficient. While the Oversight map interface provided the opportunity to review individual boat tacks for specific periods of time, there was no way to know how many days total a vessel has declared it had fished. Finally, due to the fact that the tracking unit was not performing 100% of the time, with anomalies on land or network outages, this package would not be a useful tool for enforcement purposes, as the information collected would never be able to be used in the court system due to its unreliability. Overall, while this is a package may be offered at an extremely affordable price, it does not provide the reliability and ease of use to meet the tracking, data reporting and enforcement needs of the DMR. Therefore, it is recommended that DMR explore other vendors for a tracking and data collection package, research other projects that are currently employing tracking and data collection packages in their fisheries as well as identify funding sources that could cover the costs that would potentially be associated with implementing a formal vessel monitoring and data collection program.

The following are a list of recommendations that can be utilized by Locus Traxx to improve upon their data and tracking package:

- A notification should be sent to DMR staff when a “network outage” occurs.
- When reviewing the landings reports, headers should be static.
- The vessel activity data should be downloadable in bulk fashion so DMR can query and determine how many days a vessel actively fished. This would be very helpful to both Marine Patrol and managers, as one of the incentives to industry for this project would be that they can pick their own days.
- Geo fences should be color coded and accurately depicted on the OverSight map to make easier to use.
- The software should either default to the last entry for each field, auto populate as an entry is made and/or favorite lists for ports and dealers should be available.
- A laminated cheat sheet on use of the tablet should be provided.
- Once logged in on the tablet, harvesters should stay logged in until they signed out, despite losing power or moving out of network range.
- Harvesters should be able to make up their own, easy to remember passwords.
- A large notification should be displayed once a landings report was successfully submitted; the notification should stay on the screen until the harvester clicks “ok” and a text message/email should be sent to the harvester as well.
- The tracker unit should be connected to a battery switch so there would be no tampering and the battery would not be drained.

- Ability for harvesters to review previously entered reports.
- Harvesters in the New Harbor, South Bristol, Bucks Harbor, Blue Hill and Stonington area encountered the most problems with network outages, most likely due to the limited cell coverage in these areas, which pose management and enforcement challenges. Satellite backup for tracking data did not seem to be functioning and needs to be addressed.
- Two-way communication option for emergency closings, time of day limit changes, etc. would be desirable.
- A reporting application for a harvester's mobile device/laptop in lieu of the tablet would be desirable.
- The antennas should to be marine grade and have more durable wiring/connectors.
- Size of touch options should be larger so mistakes could be reduced.

APPENDIX A

State of Maine, Department of Marine Resources
Request for Quotes (RFQ)
Specifications for Vessel Tracking and Landings Data Collection System

1. **Background:** The Maine Department of Marine Resources (DMR) seeks to develop a Maine Shrimp Vessel Tracking and Landings Data Collection Pilot Program to collect data that will enable the Department to better manage the public shrimp resource. Timely monitoring of the northern shrimp quota has been extremely challenging during the past three fishing seasons, resulting in overruns of the annual quotas. As a result, it is anticipated that the 2013 shrimp fishery will have a very low quota and a more timely data collection system could ensure that such overages do not occur in the future. Currently, both harvester and dealer reporting are required in the shrimp fishery. Dealer reporting is required on a weekly basis, while harvester reporting is required monthly; however, both harvesters and dealers frequently do not submit landings data until the time of license renewal for the next fishing season. This pilot program would test a means of obtaining daily reporting from harvesters which would provide more timely and accurate data since harvesters would not have to recall catches after a month or longer period of time has elapsed. Harvester data would also include catch not sold to licensed dealers (e.g. catch sold to peddlers or kept for personal use) that is estimated in season during the quota management.

   In addition, due to the low overall quota that is anticipated for the fishery, 2013 will potentially be a short fishing season where fishermen may be limited to a few days per week of fishing. Due to inclement weather, harvesters may not be able to fish the specified days, resulting in an unpredictable and uneven supply of shrimp for the markets. Dealers have struggled to regain Maine's place in the market for northern shrimp since the last stock decline. Therefore, the vessel tracking component of this pilot program will allow industry participants the possibility in the future to choose which days they wish to harvest based on weather and market availability.

   Finally, this pilot project may be expanded to other fisheries and could include the sea urchin and scallop fisheries. Similar to the shrimp fishery, both of these fisheries include specified harvest days as well as areas along the coast that are either closed to harvesting or are designated as Limited Access Areas. A full scale vessel tracking and data collection program may be initiated upon successful completion of this pilot project. There are a total of 633 license holders in the shrimp, 771 in the scallop and 360 in the urchin fisheries that might participate in such a tracking and data collection program. If the Department moves beyond a pilot project, it is the intent of the Department to go forward with an open, competitive RFP process.

2. **Scope of Work:** The Department is seeking bids for the lease of vessel tracking and landings data collection services for up to 30 participating vessels. The lease should include the components listed below. Leases will end at the end of the shrimp fishing season.

   a. <u>Bidder Responsibilities:</u>
   Bidder is to be responsible for the complete execution of the Implementation Plan to consist of the following steps, as further defined below:

      i. Furnishing and Installation;
      ii. Training;
      iii. Monitoring; and
      iv. Data Collection Services.

   b. <u>Furnishing and Installation:</u>
   Once the participating vessels have been identified as participating in the vessel tracking and data collection pilot program, the Contractor shall coordinate with the vessel operators to have tracking and data collection equipment installed on their vessels at locations that are central and convenient to the participants. Installation must be handled in a manner that ensures that all vessels receive the tracking and data collection units and that they are operational prior to the shrimp fishing season, which is anticipated to be

January 1, 2013. Installation involves mounting the tracking and data collection units, connection of wires and activation of the units to the network. The Contractor must provide a weekly update to DMR of the progress of installation until the successful completion of all units.

c. Training:

Once the participating vessels have been identified as participating in the vessel tracking and data collection pilot program, the Contractor shall coordinate with the vessel operators to set up training with participants at times and locations that are central and convenient to the participants. This effort should be combined with the installation of the tracking and data collection units. Training must be handled in a manner that ensures that all vessel operators have received the tracking and data collection units, that those units are operational and that vessels operators know how to adequately use them prior to the shrimp fishing season. Training must ensure that participants demonstrate a successful test run of the tracking and data collection units to the network and that participants understand how to contact the 24/7 customer service toll-free help line should an issue arise during the pilot project period. In addition, a training session must be provided for Department staff who are involved in the pilot program and a manual must be developed and provided to participants to assist with the effective use of the tracking and data collection units. The Contractor must provide a weekly update to DMR of the progress of participant training until the training of the participating vessel operators has been successfully completed.

d. Monitoring:

Monitoring to consist of transmitting positional data in the most effective manner with locations flagged that are within geo-fences established by DMR. The lease costs for monitoring shall begin once the unit is installed and activated and the vessel operator has been trained. The transmission of positional data should be grouped according to three different categories (off/stationary, on/moving in non-geo-fenced areas, and on/moving in geo-fenced areas). The flexibility to adjust the reporting frequency during these categories is required. Additionally, monitoring should allow for recognition and flagging non functional units as well as units that may have been altered (i.e. antenna blocked or removed). Services should also include making technicians available to replace non-functional and/or damaged units, in a manner rapid and efficient enough to minimized fishing delays as well as making available a 24/7 customer service toll-free help line should issues arise during the pilot project period.

e. Data Collection Services:

The data collection services are required to meet the following specifications:

i. Tracking units must be housed in a tamper-proof, marine grade, extreme temperature resistant (heat and sub-freezing), reliable, self contained single package with capabilities for wiring and sensor adapters.

ii. Tracking units should be pre-programmed with vessel ID info: the vessel operator's name, state landings #, vessel name, and hull ID

iii. Tracking units must have a button for vessel operators to push when they begin their fishing effort and end their fishing effort. These data (vessel ID info, start and end date, time, and location) must be stored and transmitted when the catch data are reported.

iv. Unit must have ability to be installed on a range of different sized fishing vessels (i.e. 10 foot open skiffs to >45 foot vessels with protective boat house) that may not all have access to shore power while not operating (i.e. on a mooring requiring generator power).

v. Must have a mechanism to determine if the unit has been tampered or altered.

vi. Must have data logging capabilities and be able to store a weeks' worth of data (if unit loses ability to transmit, the unit must still be able to record/store location, date, fishing status, and time, and transmit data once back in transmission range).

vii. Must have geo-fence capability and be able to tag data points within these geo-fences. The geo-fences will be established beforehand by DMR, and include scallop and urchin Closed and Limited Access Areas. When the vessel enters the geo-fenced areas, the data shall be flagged for easy retrieval and analysis.

viii. Will be able to accommodate additional sensor types, such as temperature monitoring and winch sensors.

ix. Must have external mechanism for vessel operator and Department to determine if unit is active (i.e. indicator light).

x. Must be able to report requested fields such as vessel ID, time, location, etc., as well as allowing for retrieval of either all or only flagged data obtained in geo-fenced areas.

xi. The transmission of positional data should be grouped according to three different categories (off/stationary, on/moving in non-geo-fenced areas, and on/moving in geo-fenced areas), and whether they are actively shrimp fishing or not. As soon as data are transmitted, the website must be updated with the information. Collected data for DMR data dumps must be available within 24 hours post vessel transmission.

    1. Off/stationary – when vessel is not in use (i.e. at the dock) or has remained stationary for a length of time, the unit should be able to record a signal every 6 hours to indicate the unit is still working properly and that the vessel is off/stationary. Transmission of data for off/stationary vessels is required in real time.

    2. On/Moving in non-geo-fenced area- when the vessel is powered up, the unit shall be activated by the vessel power and begin recording signals every 45 minutes to track movement location. Transmission of data for vessel moving in non-geo-fenced areas should occur in real time.

    3. On/moving in geo-fenced area- once the vessel enters the pre-defined geo-fenced areas, the signal shall be recorded every 15 minute; these data must also be flagged for ease of use by the Department. Transmission of data for vessels moving in non-geo-fenced areas should occur in real time.

    4. While in transmission range, data must be transmitted as outlined. If a vessel is outside transmission range, the data must be recorded and immediately sent once communication is established if outside the required transmission periods.

    5. The ability to remotely adjust the reporting frequencies of the above categories is required.

xii. Data will be the property of the DMR and will be held as confidential and the Contractor may be asked to sign a document to this effect.

xiii. Data must be in a usable format (SAS, GIS, Excel, ACCESS) and easily accessed and downloaded.

xiv. Landings and Effort Data for each trip required as follows:

    1. Harvester Name (pre-programmed)

2. State Landings # (pre-programmed)
3. Vessel Name (pre-programmed)
4. Hull ID (pre-programmed)
5. Date
6. # Of Crew
7. Gear Type (Code list to be provided)
8. Gear Quantity
9. # of Sets
10. Set Time Duration and Set Time Unit
11. Total Gear in Water
12. Depth and Depth Unit
13. Fishing start and stop times
14. Area Fished (Date and start and stop of fishing times and locations to be logged when button on unit is pushed at the beginning and end of the fishing effort for that trip)
15. Species (Code list to be provided)
16. Pounds
17. Dealer Landings # or Use Code (Use code list to be provided)
18. Port Landed (Code list to be provided)
19. Latitude
20. Longitude
21. Comments
22. Winch On/Off Sensor Data (optional)
23. Geo-fenced data must be flagged

xv. Secure web-based tracking system to allow DMR Marine Patrol to track vessels.

xvi. Must have web based interface.

1. A visual (map) representation of the location and status of each participating vessel in real time

2. Department will have secure log-ins to access and download all data.

3. Vessel operators must be provided with and trained in the proper use of an easy to use interface that includes a secure log-in to enter landings and effort data that will be uploaded to the network as well as have a visual representation of the data for their vessels to ensure accuracy. This could consist of a web-based interface that can be made accessible on a home computer and:

    a. A separate tablet with touch screen capabilities that could be mounted on board vessel or

b. A Smartphone application (Android and Apple) that can be made accessible to harvesters.

4. No licensing required for data access.

xvii. Once landings data have been submitted at the end of the fishing trip, a confirmation notification must be sent back to the vessel operator indicating the data have been received within a 12 hour period.

f. Pilot Project Termination:
Following termination of the project, the Contractor will be responsible for working with the vessel operators for the schedule and removal of equipment, should the Contractor wish to reclaim the equipment.

3. Proposal Requirements:

a. Scope of Work: Furnishing & Installation, Training, Monitoring, and Data Collection Services (**50 Points)**
The Department requires a narrative describing how each of these requirement will be met and how the work will be carried out ensuring that all participants have been successfully trained with their newly installed equipment prior to the January 1, 2013 pilot program start date. Simple restating of the Scope of Work will be deemed a minimal response. The department will require a demonstration of the final product, which includes the tracking and data collection components and its capabilities prior to commencing the installation and training portions of the pilot program. This could take place in conjunction with training of Department personnel.

b. Experience and Past Performance (25 Points)
Bidders are to provide up to 3 examples of documented experience of previously successful location monitoring and data collection services to include installation, training and servicing of the units. This could include successful implementation with other fisheries fleets, the shipping industry and/or enforcement vessels. The Department reserves the right to use its own experience with the bidder.

c. Cost Proposal (25 Points)
Lease cost to include all services listed in the Scope of Work of up to 30 devices for up to a 3-month period. Bids are sought for the per unit lease cost which should be entered in the commodity line of the electronic bid response as well as in the bidder's proposal.

4. Evaluation Process - General Information

a. An evaluation team, comprised of qualified reviewers, will judge the merits of the proposals received in accordance with the criteria defined in the RFQ, and in accordance with the most advantageous cost for the State.

b. Officials responsible for making decisions on the selection of a contractor shall ensure that the selection process accords equal opportunity and appropriate consideration to all who are capable of meeting the specifications. The goals of the evaluation process are to ensure fairness and objectivity in review of the proposals and to ensure that the contract is awarded to the Bidder whose proposal best satisfies the criteria of the RFQ at a reasonable/competitive cost.

c. Scoring Process: The review team will use a consensus approach to evaluate the bids. Members of the review team will not score the proposals individually but instead will arrive at a consensus as to assignment of points on each category of each proposal. The contract award will be made to the Bidder receiving the highest number of evaluation points, based upon the proposals' satisfaction of the criteria established in the RFQ.

d. Scoring the Cost Proposal: The total cost proposed for conducting all the functions specified in this RFQ will be assigned a score according to a mathematical formula. The lowest bid will be awarded 25 points Proposals with higher bids values will be awarded proportionately fewer points calculated in comparison with the lowest bid.
The scoring formula is:
(lowest submitted cost proposal / cost of proposal being scored) x 25 = pro-rated score

e. No Best and Final Offers: The State of Maine will not seek a best and final offer (BAFO) from any Bidder in this procurement process. All Bidders are expected to provide their best value pricing with the submission of their proposal.

5. **Number of Awards**
The Department anticipates making one award. Bidders will be notified of award results upon completion of the evaluation process. The successful bidder will be required to agree to the State of Maine terms and conditions attached to the RFQ.

APPENDIX B

State of Maine, Department of Marine Resources Request for Quotes (RFQ)
Scoring Results for Vessel Tracking and Landings Data Collection System

Pole Star

Proposal Requirements
The proposals were scored by the review team on the requirements detailed below with an overall score of **64** out of a possible 100 Points. Unfortunately, since this proposal did not have the highest score, it has been **not** been awarded the Vessel Tracking and Landings Data Collection System Pilot Program award.

Scope of Work: Furnishing & Installation, Training, Monitoring, and Data Collection Services (**35**/**50 Points)**

The Bidder provided a thorough narrative of each of these services detailing that they have secured multiple installation partner companies in Maine, a software script has been developed that will allow for geo-fencing capabilities, and the tracking units are marine-grade with vessel specific information pre-programmed. IDP-690 tracks and records a time and data of when the power source is turned on and off, while the antenna cannot be accessed without leaving evidence. For landings data, the Bidder has a website as well as a smart phone (Android and Apple) application where fishermen can enter data. They provide a 24x7x365 Help Desk & Network Operations center (NOC).

While the Bidder stated they have a comprehensive VMS training program with materials that will be available, they did not state that one-on-one training would be conducted with participants. While the IDP-690 tracking unit is marine grade, it does not have its own power supply and therefore must be connected to a power source (battery or generator). For landings data, while the Bidder does provide a website as well as a smart phone (Android and Apple) application where fishermen can enter data, a mobile device is not provided.

Experience and Past Performance (25/25 Points)

The Bidder provided a thorough description of the three previously successful location monitoring and data collection services that included installation, training and servicing of units as well as data collection services through the use of Absolute Software's E-FORMS. These includes the National Oceanic Atmospheric Administration's (NOAA) National Marine Fisheries Service (Electronic Forms Solutions) for the Pacific Islands Regional Office, the South Pacific Forum Fisheries Agency (FFA) in the Pacific, and the Australian Fisheries Management Authority (AFMA).

Cost Proposal (4/25 Points)

The Bidder provided a $1,053.33 per vessel per month cost, which includes the purchase of the unit. Unfortunately, the Bidder did not provide the required lease cost as requested in the Specifications in section 3. c) Coast Proposal: "Lease cost to include all services listed in the Scope of Work of up to 30 devices for up to a 3-month period. Bids are sought for the per unit lease cost which should be entered in the commodity line of the electronic bid response as well as in the bidder's proposal." *Therefore, the Bidder's proposals costs is the highest received. Compared to the lowest cost, which was $5,399.10, Pole Star received 4.27 of a possible 25 Points.*

The scoring formula: ($5,399.10/ $31,600.00) x 25 = 4.27 Points

Alltrackers

Proposal Requirements
The proposals were scored by the review team on the requirements detailed below with an overall score of **14** out of a possible 100 Points. Unfortunately, since this proposal did not have the highest score, it has been **not** been awarded the Vessel Tracking and Landings Data Collection System Pilot Program award.

Scope of Work: Furnishing & Installation, Training, Monitoring, and Data Collection Services (**7**/**50 Points)**

The Bidder did provide information stating that a 24/7 toll free help line would be made available.

The Bidder did not provided a thorough narrative of Furnishing and Installation services to be undertaken. The Bidder did not provide a description of the Training or if any reference or training materials would be made available. While the tracking units is stated as being in a waterproof case, it does not state that there is a constant power source while being operated, rather the unit has a USB port that it is assumed can only be accessed when not attached to the vessel and the waterproof case is open to access that port. If the unit is tampered with, a signal will be sent to a smart phone or computer. The unit does not have a button to push when they begin their fishing effort and fishing activity cannot be assumed with a geofence capability only, as the Bidder suggested. The Bidder did not provide a descriptive narrative on how data would be captured and transmitted.

Experience and Past Performance (0/25 Points)

Bidder did not provide any narrative describing any of their past experiences or performance.

Cost Proposal (7/25 Points)

The Bidder provided a total cost of $20,250.00 for 30 participating vessels for the 3 month period. Compared to the lowest cost, which was $5,399.10, Alltrackers received 6.67 of a possible 25 Points.

The scoring formula: ($5,399.10/ $20,250.00) x 25 = 6.67 Points

Locus Traxx

Proposal Requirements
The proposals were scored by the review team on the requirements detailed below with an overall score of **80** out of a possible 100 Points. Since this proposal had the highest score, it has been awarded the Vessel Tracking and Landings Data Collection System Pilot Program award. The successful bidder will be required to agree to the State of Maine terms and conditions attached to the RFQ.

Scope of Work: Furnishing & Installation, Training, Monitoring, and Data Collection Services (**40/50 Points)**

The Bidder provided a thorough narrative of each of these services, as well as accommodated the Department's request to change the locations of installation from Portland, Boothbay, Rockland and Jonesport to Stonington, South Bristol, Port Clyde or Tenants Harbor and Portland, if necessary. For training, they have stated that they will conduct one-on-one training, which is the preferred method. They will provide participants with reference materials, as well as will provide training to DMR staff the week of December 3. They will provide a 24/7/365 customer support team toll free. For monitoring, they will utilize both cellular and satellite networks in order to provide the lowest cost option to the Department. Their tracking units are stated as being marine-grade and they clarified that the web-based interface will be made available on a separate tablet with a waterproof marine grade dry bag. The units have a geo-fenced capability. Finally, the Bidder clarified that tampering with the unit will trigger an alert that can be sent via text message, email or via phone through the customer service team.

However, the only method for data entry is with the tablet; there is no web-based data entry interface option available to participating vessel for them to review their landings data to ensure it is accurate. .

Experience and Past Performance (15/25 Points)

While the Bidder did provide 3 examples of documented experience of previous location monitoring and data collection services ("Oil Piranha", a Produce Grower and the State of Maine Marine Patrol), they only successfully demonstrated the tracking, installation and servicing of the units portions of what is sought for this pilot program. For the data collection portion of this project, there is no successful past demonstration stated on which to evaluate this Bidder with unfortunately.

Cost Proposal (25/25 Points)

The Bidder provided the most competitive bid of $59.99 per month per vessel at any level of vessel participation, for a total cost of $5,999.10for 30 participating vessels. Therefore, the Bidder received a score of 25 Points and the other proposals with higher bid values were awarded proportionately fewer points calculated in comparison with this lowest bid.

APPENDIX C

FISHERMEN'S FEEDBACK QUESTIONAIRE (Scale of 1-5)

- How user friendly was the overall system?
- How user friendly was the first generation tablet?
    - Where screens activated with wet hands?
- How user friendly was the second generation tablet?
- How user friendly was the software?
    - Did you understand what you were supposed to put in the box?
    - Could you proceed to the next screen easily?
    - Was it easy to log in?
    - Did you have to re-log in half way through the day due to a network or power outage?
    - Did you remember to hit the button when you "started" and "ended" your fishing trip?
- How user friendly was the Tracking Unit?
    - Did you have to disconnect/reconnect the power?
    - Did you have to reset the tracker unit?
- How user friendly was the 24/7 Support Staff?
    - Did you speak to a person right away?
    - If you were not able to reach a live person, did they get back to you in a prompt manner?
- Where you satisfied with the installation?
- How effective was the training that was provided?
- What are the changes that you would like to see?
    - Tracker unit (small, drain battery power)
    - Tablet (waterproof/temp proof/shock proof housing, battery power, ease of use?)
    - Software (auto populate, default settings, drop down boxes, move forward/backwards through screens/data entry points)
- How user friendly was the user guide? (laminated/printed on waterproof paper, easy to read)
- When reports were submitted, but didn't go through, did you see a confirmation box with "OK" on it?
- For unsuccessful reports, were you still connected to power when it was sent?
- Do you want the unit removed?